Transport Canada Transports Canada

TP 1624

Marine Casualty Investigations

Enquêtes sur les accidents maritimes

Investigation Report to the Minister pursuant to sections 477 or 480 of the Canada Shipping Act (1985)

Rapport d'investigation au Ministre conformément aux articles 477 ou 480 de la Loi sur la marine marchande du Canada (1985)

Canada

Ce rapport est aussi disponible en français.

REPORT OF INVESTIGATION INTO THE SINKING OF A SMALL OYSTER FISHING BOAT IN WALLACE RIVER ESTUARY, NOVA SCOTIA, WITH THE SUBSEQUENT DEATH OF THE TWO OCCUPANTS, NOVEMBER 11, 1988.

REPORT No. 529

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REPORT OF INVESTIGATION INTO THE SINKING OF A SMALL OYSTER FISHING BOAT IN WALLACE RIVER ESTUARY, NOVA SCOTIA, WITH THE SUBSEQUENT DEATH OF THE TWO OCCUPANTS, NOVEMBER 11, 1988.

Particulars of Vessel

Name	None
Official Number	None
Licence Number	None
Port of Registry	None
Length	4.87 m (16.0')
Breadth	1.67 m (5.5')
Draught (Estimated at time of incident)	10.0 cm (4") Forward and Aft
Type	Open boat of wooden frame and plywood construction
Built	1985 at the home of the deceased, Wallace, Nova Scotia
Propulsion	One 15 hp, (11.2 kW) outboard, gasoline engine capable of ahead and reverse modes
Auxiliary Propulsion	One wooden oar (scull)
Cargo	Approximately 157 kg of clams (quahogs) in three crates
Crew	Two
Owner	Kilburn Elliott Wallace Bridge, Nova Scotia

Navigating Equipment

Nil

Lifesaving Appliances

Lifejackets	Two (of boating standards, none Ministry of Transport approved)

Bailer	Plastic, modified container

Anchor

One, kedge type	Fashioned from 25 mm steel bar

Radio Communications Equipment

Nil

Description of Boat

The boat was open throughout its length with the exception of a small decked in area (apron) reaching from gunwale to gunwale at the bow section and which was open at the after end. (See photographs.) The freeboard; i.e., height of gunwales above the water level, when in the light condition, was 40 cm (16"). It was designed for oyster fishing and clam digging during fair weather in the tidal reaches of Wallace Bay and the Wallace River estuary.

Oyster fishing is essentially a shallow water operation which requires the person fishing to stand in the boat while using oyster tongs (see photograph); consequently, the design took into account the need for very positive stability. There was also the need for frequent grounding on the mud flats which contain the clam beds in order for the occupants to walk on the beds while digging for clams.

The resultant design gave the boat a proportionately large beam measuring approximately one-third of its length, which provided the stability and also gave a consequently shallow draught. It was also virtually flat bottomed, the rise of floor; i.e., height of the outer sides of the bottom above the keel being only some 7.5 cm.

A metal anchor and two lifejackets were stowed under the apron.

Propulsion was by means of a 15 hp; i.e., 11.2 kW, outboard engine which was removable and clamped to the transom.

While there was no requirement that the boat be registered pursuant to the Canada Shipping Act, as she was powered by a motor of more than 7.5 kW there was a requirement that the boat be licensed under the Small Vessel Regulations. The boat was neither registered nor licensed. Being a small boat under 15 tons, gross tonnage, she was not required to be inspected by the Ship Safety Branch of the Canadian Coast Guard.

Note: All times in this report are expressed in Atlantic Standard Time (UTC minus 4 hours).

Background

The two fishermen had decided to leave from their private beach at Wallace Bridge, Nova Scotia, during the early morning of November 11, 1988, in order to proceed, each in his own boat, to the oyster beds in Wallace River estuary.

The sale of the shellfish was part of their living as commercial registered fishermen and each held an oyster fishing license.

It became apparent that they had fished and caught oysters and then returned to the beach, but from that time had decided to proceed to another part of the bay which was some 0.5 mile distant, taking only one of the boats, in order to re-seed the clam beds with clams (quahogs) which they had previously dug.

While enroute to the beds, the boat swamped and sank in position 45°49.1'N, 63°30.7'W resulting in the death by drowning of those on board.

The boat was salvaged and both bodies were later recovered from the bay by search parties. There was no pollution as a result of the incident.

Particulars of Deceased

Name	Donald James Elliott
Address	Wallace Bridge, Nova Scotia
Age	20
Position on Board	Fisherman
Cause of Death	Drowning
Body Recovered	November 15, 1988

Name	Gregory Charles Elliott
Address	Wallace Bridge, Nova Scotia
Age	19
Position on Board	Fisherman
Cause of Death	Drowning
Body Recovered	November 16, 1988

Narrative

The two fishermen, who were brothers, resided at their parents' home in Wallace Bridge, Nova Scotia. They had decided to go fishing for oysters during the morning of November 11, 1988, and had advised their parents of that

intent but not of their intent to transport quahogs and re-seed the clam beds. At 0700 they left their home to proceed to a beach some 500 m distant on the shore of the estuary where their boats were secured.

The last time they were seen was at 0945 that day when they were observed oyster fishing from their respective boats within shouting distance from the beach, approximately 100 m offshore.

No further communication was made with them after they had left home. Therefore, the events that followed and which led to their deaths could only be compiled from the evidence provided by the salvaged boat and engine, the quantity and position of the oysters which they had fished, the position of an apparently jettisoned crate and its content of quahogs and the statements of close relatives who were aware of their intentions and methods of fishing.

Due to the rising tide, it was estimated that the oyster fishing operation would have taken no longer than 3 to 4 hours and when they had not returned by 1130 the father of the two became anxious and looked from his home across the estuary but could not see the boat. The weather was clear with unlimited visibility and under those conditions the boat should have been sighted.

Both of the fishermen's boats had been moored at the beach and, as was the usual practice, each had taken his own boat to the oyster beds. On checking the beach, it became evident that they had returned after fishing, unloaded their catches of oysters and then taken one of the boats back into the estuary, this time to re-seed an area with three crates of quahogs which they had previously dug and stored on the beach; the purpose of re-seeding was for spawning and future fishing.

An uncle of the two who had also been oyster fishing that morning was contacted to inquire of their whereabouts' however, he had not seen them. The time was now 1330 and a visual search of the estuary was implemented by driving along the coastal roads in a truck. At 1400, not having seen the boat from the land, a sea search was started in the other boat and at 1630 the missing boat was found submerged in approximately 1.5 m (5') of water on the edge of a mud flat. (See copy aerial survey.) There was no sign of the two occupants.

The alarm was raised at 1645 and a land and sea search was immediately implemented by local persons which was co-ordinated and assisted by RCMP personnel, including divers.

Salvage of the boat revealed that it was resting on the mud in an upright position and two crates of quahogs, which were still upright and centrally positioned, were in the forward end; the other crate was missing. A later search of the dried out mud flats revealed that the other crate had apparently been jettisoned.

The quahogs and their three plastic crates were estimated to weigh a total of some 157 kgs, and had been placed at the forward end of the boat, presumably to balance the weight of the two fishermen who would have sat at the after end of the boat on the only available thwart (seat) which was situated by the engine operating/steering position.

The boat's position was first discovered through finding its red coloured, gasoline container which was floating on the surface while still attached to the engine by its gasoline feed line. In addition, the wooden handles of the 3 m (9') long oyster tongs were protruding above the water.

The two bodies, clad in winter and waterproof clothing but without lifejackets, or other form of personal flotation device (PFD), were recovered from the channels in the estuary 4 days and 5 days later after extensive sea and land searches. Medical examinations showed that both persons had died due to drowning and autopsies were not considered necessary.

Analysis

1. Wallace River estuary and harbour

The harbour and estuary are some 5 miles long by 0.6 mile wide and run in an east-west direction, the harbour is to the east, the estuary to the west. (See chart.)

Depths of water and the heights to which the mud flats dry at low tide are only shown on charts for the area of the harbour and its general approaches; they are not shown for the area of the estuary where the casualty occurred. However, aerial survey photographs taken during a period of low tide clearly show the mud flats to be dry and the main deep water channel to divide, one branch running generally north-west and the other west where it joins the mouth of the Wallace River. (See photocopy of aerial survey). Observation of the area at high tide showed the flats to be covered, with a clear stretch of water from bank to bank giving a reach of approximately 0.5 mile of water from the west bank to the position of the casualty.

2. Tides

The Canadian Tide and Current Tables, Volume 2, issued by the Canadian Hydrographic Service, indicate that a low tide occurred at 0603 November 11, 1988, followed by a high tide at 1253 and that the rise of the tide was 2.2 m. To calculate the tidal predictions for Wallace, the secondary port of Pugwash, some 8 miles westward, has to be used. The predictions for Pugwash are based on the reference port of Charlottetown, P.E.I.; however, local knowledge indicates that tides are subject to fluctuations in times and heights, the fluctuations governed by existing environmental conditions. It was considered that high tide that day occurred 30 minutes later than predicted. It follows that calculated tidal times and heights contained in this report can only be approximate.

Local knowledge also indicates that the channels have depths of some 2.0 m at low tide at which time the mud flats in the area dry to an average height of some 30 cm; therefore, the average depth of water in the channels and above the flats at high tide was in the region of some 4.2 and 1.9 m respectively.

3. Weather forecasts and observations

Weather forecasts issued by Environment Canada at 1700 the previous day, Thursday, November 10, for the Northumberland Strait area, which includes Wallace, read in part:

> Storm warning continued
> Winds westerly 15 knots increasing to southerly 20 to 30 early this evening and to southeast 40 to 55 overnight. Gales shifting to westerly 40 to 55 Friday morning ...
>
> Outlook for Saturday ... moderate to strong northwesterlies.

Forecasts at 0045 and 0530, November 11, continued to give storm warnings with southerly and westerly gales of 35 to 45 knots.

It is not known whether the two fishermen had heard or were aware of the forecasts.

An Environment Canada automatic weather recording station situated at Caribou Point, Nova Scotia, which is some 30 miles east of Wallace, recorded winds to be

southerly 28 to 36 knots at 0700, November 11, diminishing to south by west 15 to 22 knots at 1100. It should be noted that the contours of the land can greatly affect offshore winds, as apparently happened in this case, causing localized differences in direction and increases in velocity as the winds follow the land contours.

There was reportedly only one other oyster fisherman working in the area that morning; he had left his home at 1000 and fished using a similar boat at a position further inside the estuary and at a distance of some 1.5 miles to the west of the position of the casualty, an area which is in narrower and more sheltered waters. He recollected the wind to have been south-westerly, approximately 20 knots at 1000 and to have increased to 30 knots by the time he returned at 1200. The height of the waves during his return necessitated keeping close inshore, in order to take advantage of the lee of the land.

4. **Time that the mud flats covered**

Low tide had occurred at 0603 and the rise of water to high tide at 1253 was some 2.2 m; assuming the flats to have been dry to a height of 30 cm at low tide, then the time elapsed for the tide to rise 30 cm was some 1 hour 39 minutes. Therefore, taking into account local knowledge that the tides were running some 30 minutes later than predicted the flats would have covered at approximately 0812.

5. **Conditions governing oyster fishing**

Oysters remain submerged, unlike clams which thrive on the mud flats which dry out with each tide. Therefore, oyster fishing is carried out in the channels which pass through the mud flats in the estuary and which are permanently covered by water. The length of the oyster tong handles was 3.0 m, therefore, they would no longer adequately reach the oyster beds once the tide had risen to a height of 2.7 m above the constantly submerged sides of the channels. The time at which that would occurred was estimated to have been at about 1015; consequently, oyster fishing would have been stopped at a time no later than 1015.

6. **Time elapsed while fishing**

The observed catch was 5 buckets of oysters which had been left on the beach, each bucket being of 5 gallons

capacity.

Other experienced fishermen considered that amount to be compatible with the period from 0700 until about 1015, when it estimated that fishing would have been stopped due to the high level of tide.

7. Decision to re-seed the clam beds

The quahogs were larger than the market required and the price paid was less than at other times; therefore, rather than sell them, the possibility of re-seeding had been discussed by the family. However, no one was aware that the intent was to transport and re-seed them that morning, from which it seems the decision was made either during or immediately after oyster fishing.

8. Boat's loaded condition

Measurements of the freeboard, from the water and weed marks on the hull to the top of the gunwales at the centre length, showed that in the light floating condition the height of the gunwales above the waterline was 40 cm (15.75").

A conservative estimate of the weight of the two occupants plus the quahogs came to 295 kg; therefore, the reduction of freeboard in the loaded condition was calculated to have been in the region of 4.5 cm, giving a final even keel freeboard of some 35.5 cm (14"). This freeboard could have been reduced either forward or aft depending on whether there was a forward or aft trim.

9. Estimated time of casualty

Assuming that oyster fishing had stopped at 1015, it was estimated that a further 30 minutes would be required to travel the 100 m or so to the beach, unload the oysters, load the quahogs and travel the 0.5 mile to the position of sinking; this places the time at 1045.

10. Height of tide at 1045

Taking into account that the local knowledge of the tide running 30 minutes late was correct, then it is calculated that the height of tide at 1045 was some 1.74 m above datum, 1.34 m above the mud flats and therefore there would be some 3.74 m in the channels. The tide was flooding with some 2 hours 38 minutes remaining to high water.

11. **Sea state at time of casualty**

Fishing for oysters commenced at a time shortly after 0700 and it is calculated that the mud flats would have covered at approximately 0812. The sea state in the channels would have been negligible while the flats were uncovered but the sea in general would have become gradually more and more rough as the depth of water over the flats increased. The 0.5 mile of reach over which the 20 to 30 knot wind was blowing against the flood tide would cause short steep waves over the flats and rougher water over the channels and their edges.

12. **Height of tide at time of finding boat, 1630**

The tide had been ebbing for 3 hours 37 minutes when the boat was found and calculations show that the height of tide at that time was 1.74 m. Taking into account the boat was resting on the edge of a mud flat at the side of a channel, then this would place it as described; i.e., submerged in approximately 1.4 m.

13. **Condition of boat and equipment when salvaged**

When found, the boat was submerged and resting on the mud flats in an upright position with two crates of quahogs still in the forward part which were upright, centrally positioned and containing apparently all of their quahogs.

The boat was salvaged by being lifted bodily between two other larger fishing boats and was found to be undamaged; the two lifejackets were stowed in their usual positions under the apron forward with the steel anchor stowed on top of them.

The engine controls were set in the forward mode but it could not be determined at what position the twist grip accelerator had been used due to it being designed to return to low speed when released.

The gasoline container was partly filled with gasoline. After the engine had been dried and the oil changed, it was started and run without difficulty.

The wooden oar and plastic bailer were both missing and it is assumed that they floated free.

14. Examination of the mud flats at low water the following day

During the low tide of the following day, November 12, other fishermen searched the mud flats and found the other crate of quahogs. It was lying on the mud some 10 m from where the boat had been found, partly containing quahogs and with other quahogs in heaps and in a line stretching down river over a distance of some 50 m from the sunken boat's position. From this, it would seem that the crate of quahogs may have been jettisoned in an attempt to lighten the boat as it sank.

15. Boat's buoyancy

The boat's buoyancy while afloat relied on the water it displaced; when swamped, flotation relied on any inherent buoyancy contained in its wooden construction. There was no additional form of inherent buoyancy such as buoyancy tanks or other form of flotation material.

It was apparent that the combined weight of the quahogs, anchor and engine was sufficient to overcome any buoyancy that might have been provided to the boat by its wooden construction and the two stowed lifejackets.

16. Probable cause of the casualty

Consideration has been given to the causes being related to collision, boat handling, engine failure or misuse, or the structural failure of the boat.

However, the condition of the boat indicated that causes could not be attributed to the striking of another boat or object, the failure of any structural member or the failure or misuse of the engine. Therefore, the conclusion reached, taking into account all of the known circumstances, is that the boat ventured into waters too rough for its loaded condition, and became swamped and sank quickly and unexpectedly without the occupants having time to jettison all of the cargo, nor time to reach for, or don, the lifejackets.

17. Occupants' qualifications and experience

Both occupants had considerable part-time experience of fishing in various type of boats for various species, including oysters, clams,lobsters and groundfish; however, they were both experiencing only their second year of full-time fishing and reportedly this was the first time they had attempted to transport quahogs to

re-seed the clam beds.

Neither held formal marine qualifications nor were they required to by regulation. However, both were registered as commercial fishermen and had oyster fishing licenses issued by the Department of Fisheries and Oceans.

18. Swimming ability and clothing

Both of the boat's occupants were reportedly good swimmers; however, neither had the time to reach for or don the two lifejackets and both were clad in winter clothing and boots with an outer covering of waterproof clothing, which would have considerably reduced their ability to remain afloat without the aid of a personal flotation device (PFD), such as a lifejacket.

They both possessed flotation jackets which are designed to be worn while at sea under circumstances where a mishap may find the wearer suddenly immersed in the sea; however, the jackets had been left at home. Reportedly the two men had found the exertion of fishing while wearing the jackets caused discomfort through overheating due to the flotation material having a high insulation value; consequently, they seldom wore them.

The discomfort caused by flotation jackets is widely known by fishermen; however, it is known that many wear them while proceeding to and from the fishing grounds, exchanging them for waterproof clothing before and after fishing.

19. Survival time

A Canadian Red Cross Society pamphlet entitled 'Cold Water Survival' graphically illustrates the survival time for average adult persons who are wearing standard lifejackets, are lightly clad and holding still in ocean water. (See annex I). With a seawater temperature of 7°C which was prevalent at the time of the casualty, such persons have a strong possibility of survival if rescued within 50 minutes. Between 50 minutes and 2 hours of immersion, the persons will become weak and unable to help themselves. After 2 hours death will occur due to hypothermia; i.e., loss of body heat.

Taking into consideration that:

- the seas in the vicinity of the casualty were estimated to be steep, and

- the two occupants, although good swimmers, were heavily clad in winter clothing and boots and were not wearing lifejackets or any other form of PFD,

it is highly unlikely that they would have remained afloat for any significant period of time and consequently their survival time would have been minimal.

Had they worn PFD's, then it is possible they would have remained alive for up to 2 hours after immersion and before succumbing to hypothermia, in which event the initial visual search at 1130, which was 45 minutes after the estimated time of the casualty, might have been successful and may have led to a successful rescue.

20. **Small Vessel Regulations**

The Small Vessel Regulations are made pursuant to the Canada Shipping Act and Part I of the Regulations entitled Licensing of vessels states that they apply to every vessel principally maintained and operated in Canada, provided they are not registered under the act. Under Subsection 1(b) of the Regulations, a vessel is required to be either registered or licensed if it:

> ... is equipped permanently or temporarily with a motor of 7.5 kW or more.

The boat in use was equipped with a motor of 11.2 kW power, however, it was neither registered nor licensed.

Findings

Whilst engaged in a commercial shellfish fishery in the River Wallace Estuary, N.B., a small boat swamped and sank during unfavourable weather conditions, resulting in the drowning of the two occupants.

In the absence of any witness to the casualty, the precise causes cannot be ascertained; however, it would appear that the following causes are the most probable:

- the adverse weather conditions forecast were encountered;

- neither occupant had experience in the use of the boat for reseeding purposes;

- the boat was small and overloaded for the sea state considering the wind against flood tidal conditions encountered; and

- the boat swamped and sank quickly and unexpectedly.

The two occupants lost their lives due to drowning which was contributed to by the following factors:

- although reportedly good swimmers, both were heavily clad in winter and waterproof clothing;

- neither was wearing a lifejacket or any other form of PFD; and

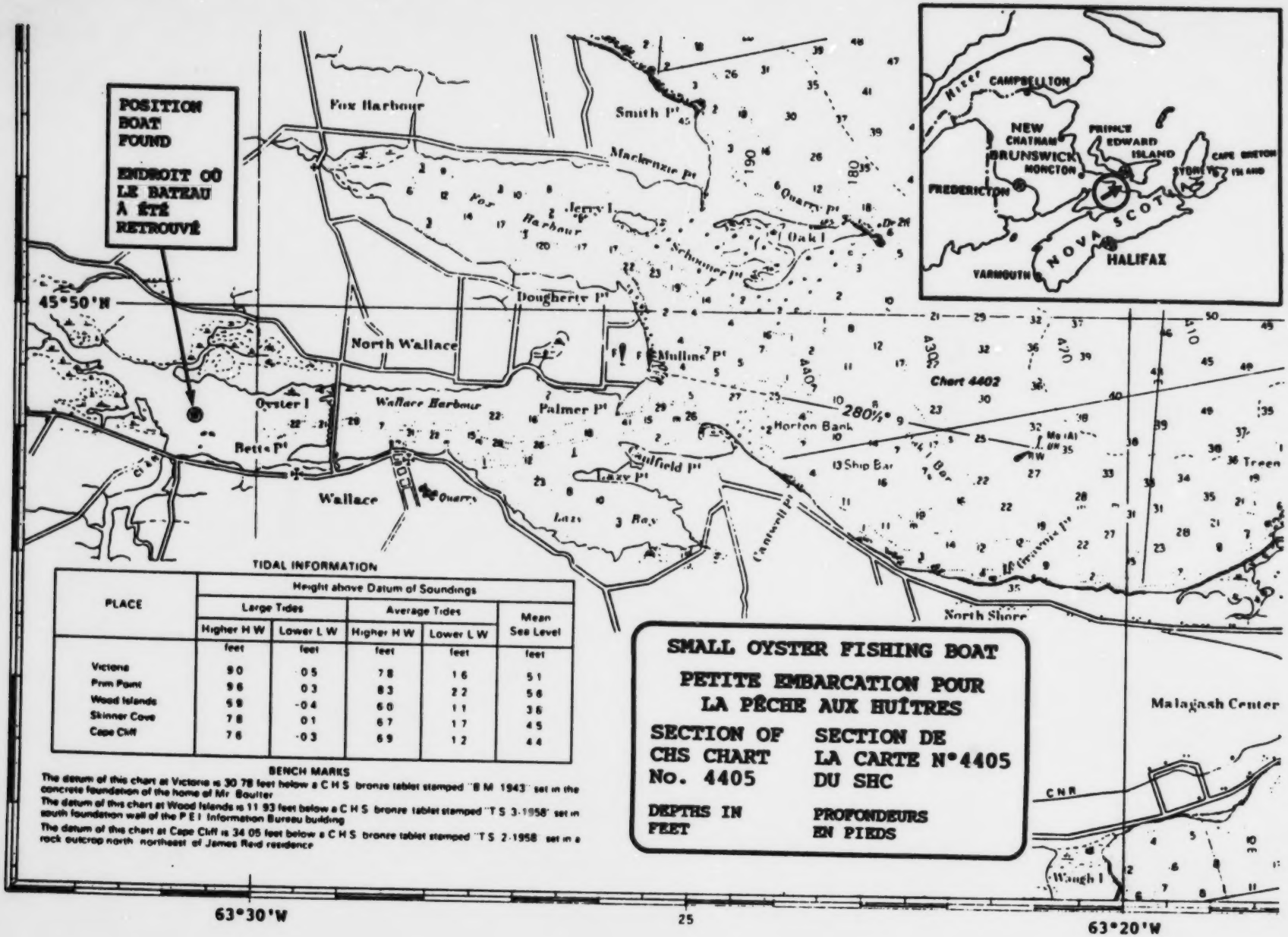
- the boat itself had no additional internal buoyancy.

Other Findings

The boat was neither registered nor licensed.

MARINE CASUALTY INVESTIGATIONS
TRANSPORT CANADA
8TH FLOOR
110 O'CONNOR STREET
OTTAWA, ONTARIO.
K1A 0N5

OTTAWA, ONTARIO
AUGUST, 1989.



TIDAL INFORMATION

PLACE	Height above Datum of Soundings				
	Large Tides		Average Tides		Mean Sea Level
	Higher H W	Lower L W	Higher H W	Lower L W	
	feet	feet	feet	feet	feet
Victoria	9 0	0 5	7 8	1 6	5 1
Prim Point	9 6	0 3	8 3	2 2	5 8
Wood Islands	6 8	-0 4	6 0	1 1	3 6
Skinner Cove	7 8	0 1	6 7	1 7	4 5
Cape Cliff	7 6	-0 3	6 9	1 2	4 4

BENCH MARKS

The datum of this chart at Victoria is 30 78 feet below a C H S bronze tablet stamped "B M 1943" set in the concrete foundation of the home of Mr Boulter

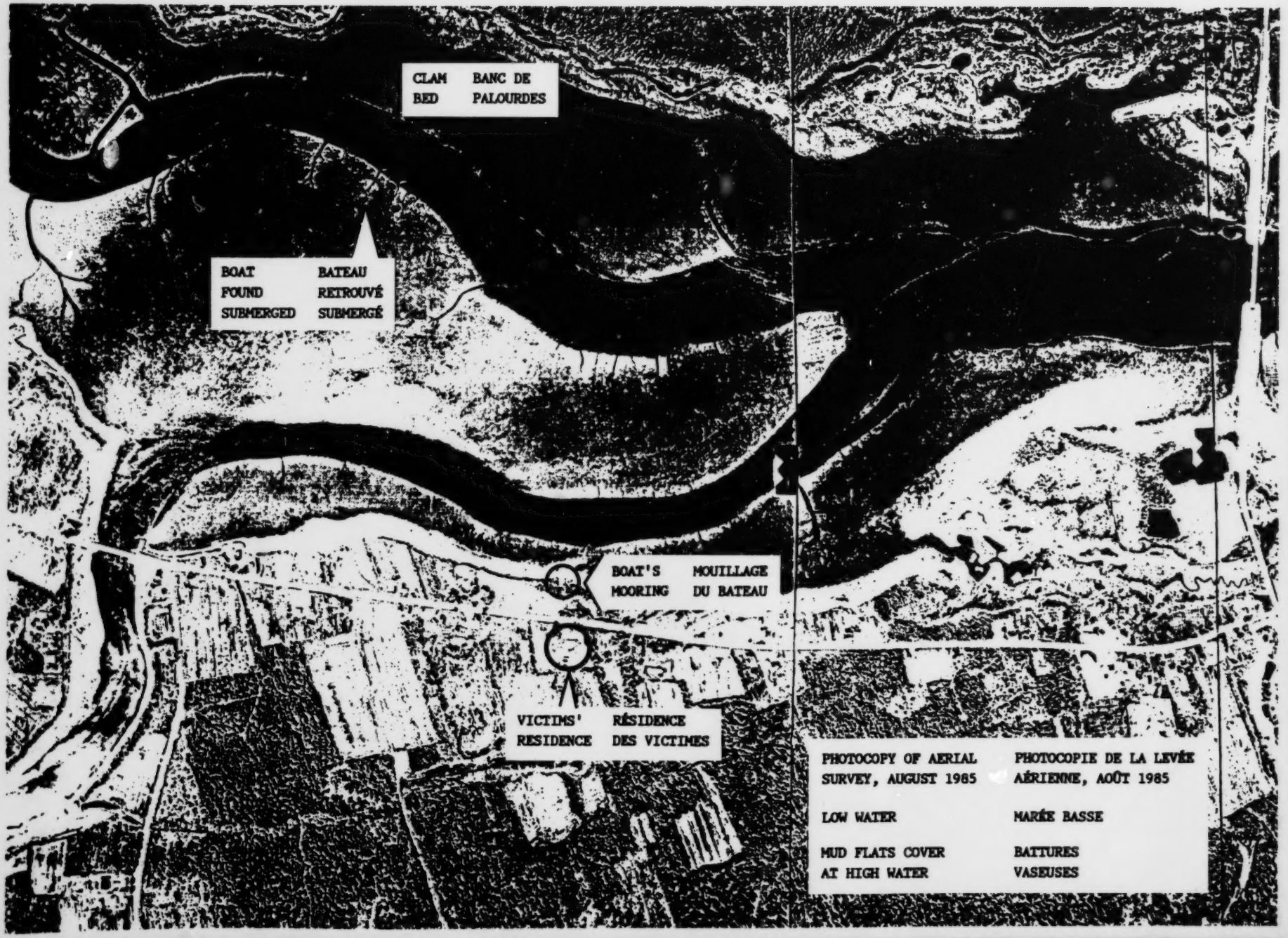
The datum of this chart at Wood Islands is 11 93 feet below a C H S bronze tablet stamped "T S 3-1958" set in south foundation wall of the P E I Information Bureau building

The datum of this chart at Cape Cliff is 34 05 feet below a C H S bronze tablet stamped "T S 2-1958" set in a rock outcrop north northeast of James Reid residence

SMALL OYSTER FISHING BOAT

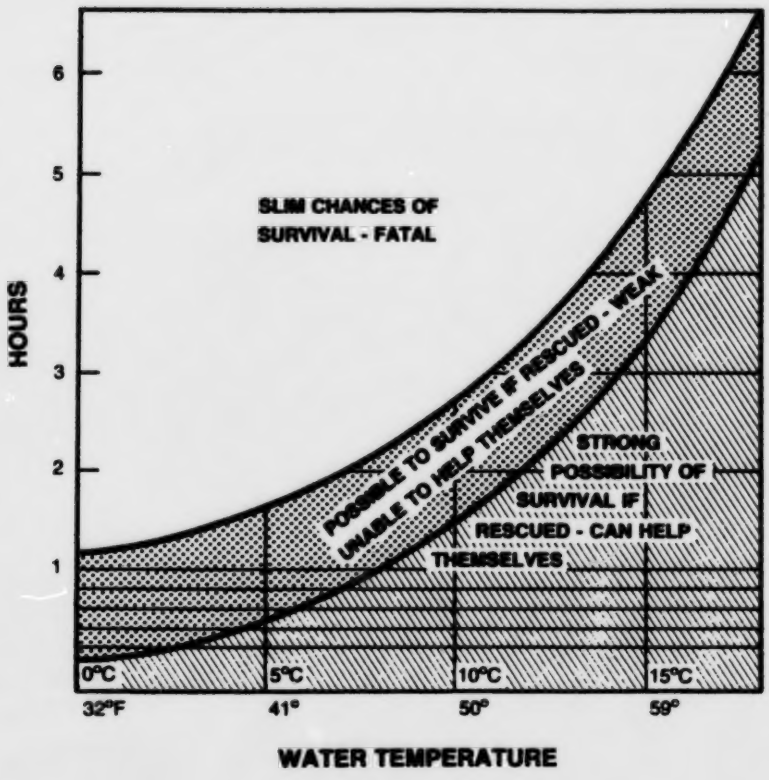
PETITE EMBARCATION POUR LA PÊCHE AUX HUÎTRES

SECTION OF CHS CHART No. 4405	SECTION DE LA CARTE N°4405 DU SHC
DEPTHS IN FEET	PROFONDEURS EN PIEDS


CLAM BANC DE
BED PALOURDES
BOAT BATEAU
FOUND RETROUVÉ
SUBMERGED SUBMERGÉ
BOAT'S MOUILLAGE
MOORING DU BATEAU
VICTIMS' RÉSIDENCE
RESIDENCE DES VICTIMES
PHOTOCOPY OF AERIAL SURVEY, AUGUST 1985
PHOTOCOPIE DE LA LEVÉE AÉRIENNE, AOÛT 1985
LOW WATER
MARÉE BASSE
MUD FLATS COVER AT HIGH WATER
BATTURES VASEUSES

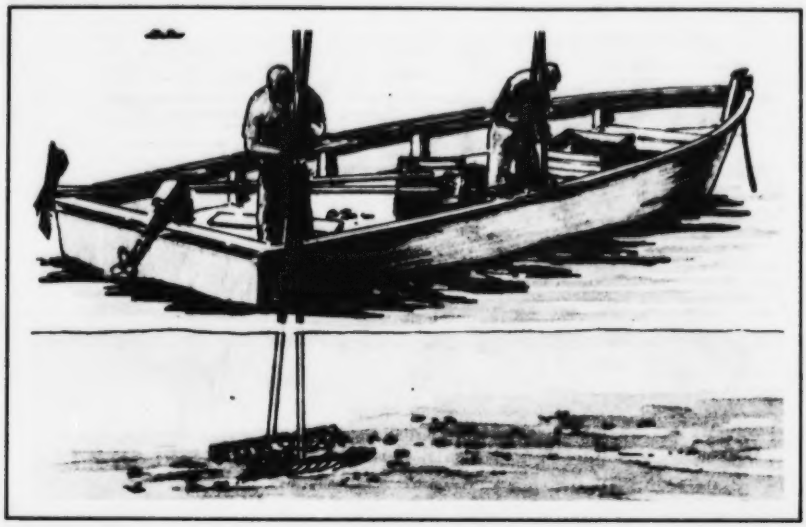
ANNEX I

COLD WATER SURVIVAL



The accompanying graph shows average predicted survival times of average, adult humans in water of different temperatures. The figures are based on experimental cooling of average men and women who were holding still in ocean water and wearing a standard lifejacket and light clothing. The graph shows, for example, that predicted survival time is about 2½-3 hours in water of 10°C (50°F). Predicted survival time is increased by extra body fat and decreased by small body size. Although women generally possess slightly more fat than men they cool slightly faster due to their usually small body size. However, for comparable sizes, the man will cool faster.

"COLD WATER SURVIVAL"
CANADIAN RED CROSS



Oyster Tonging

Tonging is the main method used to harvest oysters. It is used on natural oyster beds and small leased areas where regulations prevent the use of other equipment.

Tongs consist of a pair of rakes attached to long, wooden scissor-like handles. The handles are joined together approximately one-third of the way from the end of the rakes. The teeth of the rakes point inward and some tongs have baskets attached on both ends. The handles vary from three to eight metres in length.

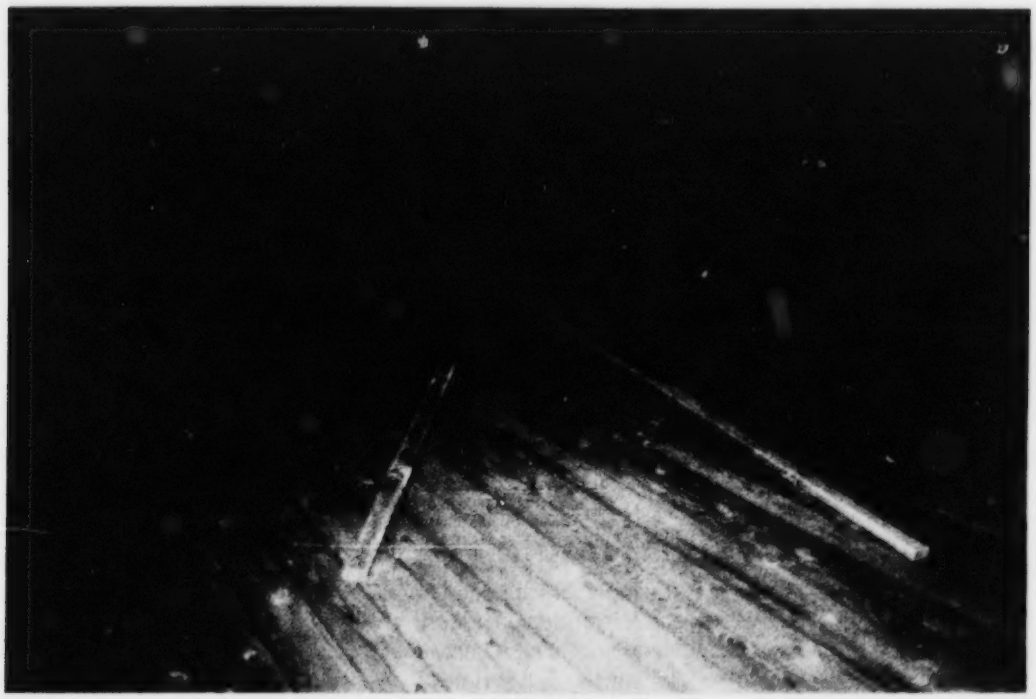
With a series of short lifting movements, the oysters are scraped off the bottom and gathered up into the boat. The vessels used in the operation are usually small because they are more versatile. Harvesting oysters with tongs is a very time-consuming operation because tongs can be used only when the water is calm, and tongs are not efficient in water over five metres deep.

Pinces à huîtres

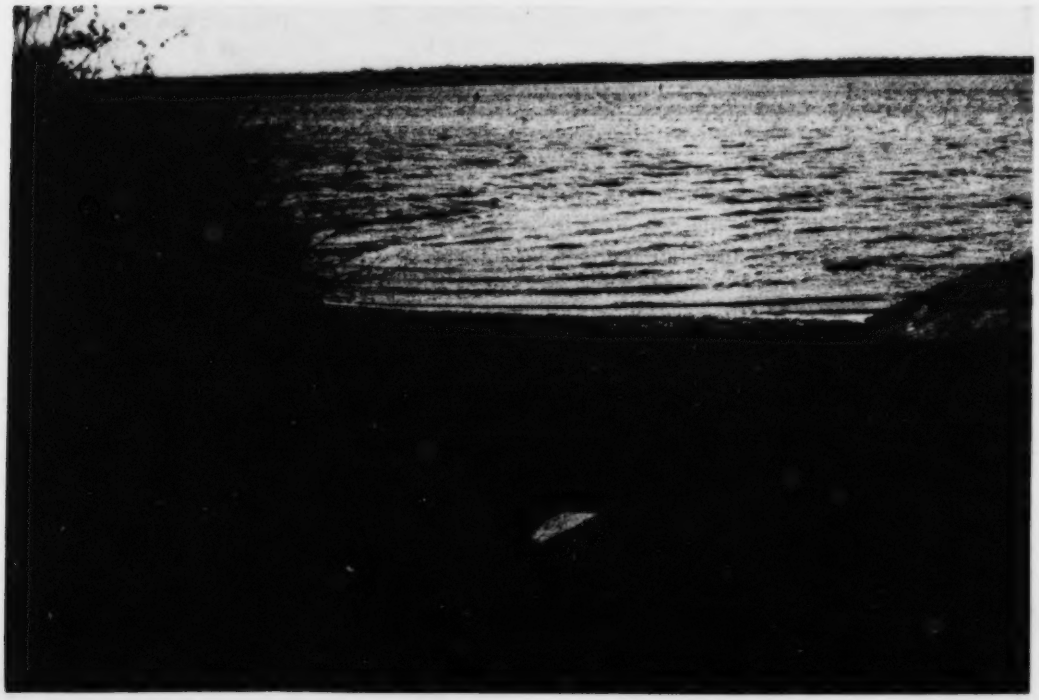
C'est avec une pince qu'on récolte principalement les huîtres, sur les bancs d'huîtres naturels et dans les petites zones louées à bail où le règlement interdit l'utilisation de tout autre équipement.

L'engin est composé d'une paire de râteaux attachés à de longs manches de bois attachés comme des ciseaux. Les manches sont rattachés à un tiers de leur longueur environ depuis les râteaux. Les dents des râteaux se font face; certains engins sont équipés de paniers fixés aux deux extrémités. La longueur des manches varie de trois à huit mètres.

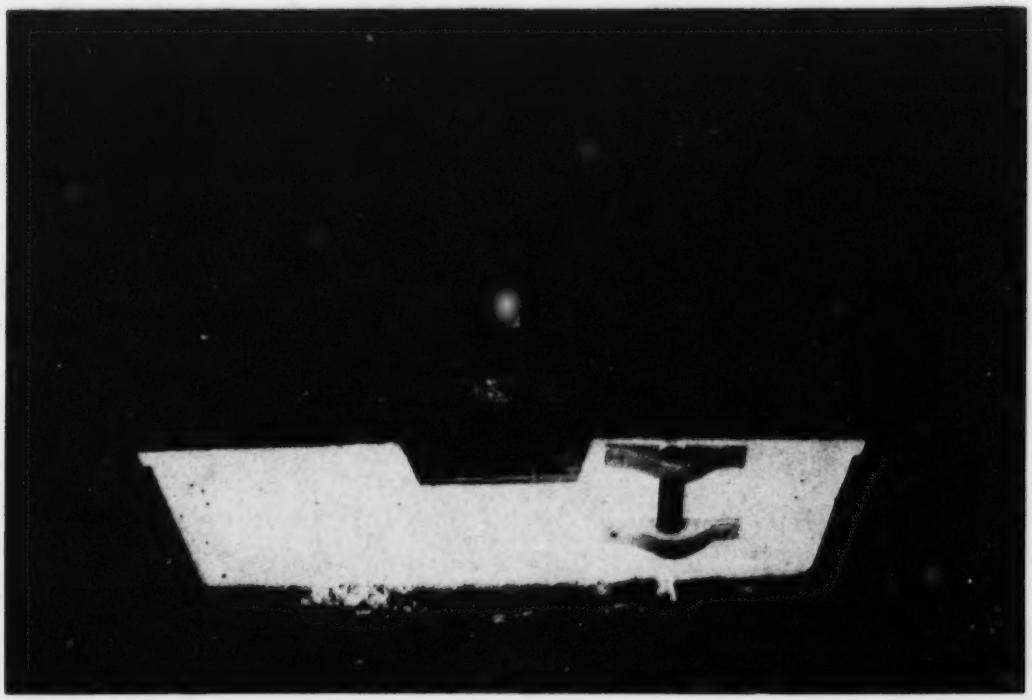
Le pêcheur détache les huîtres du fond au moyen d'une série de petites secousses vers le haut et les huîtres rassemblées sont ensuite ramenées à bord. On utilise généralement de petits bateaux, plus faciles de manoeuvre au cours de cette opération. Cette méthode, qui demande aussi beaucoup de temps, ne peut servir qu'en eau calme. Par ailleurs, les râteaux ne sont pas aussi efficaces à plus de cinq mètres de profondeur.



Oyster tongs which were in the boat.
Pinces à huîtres qui étaient dans l'embarcation.

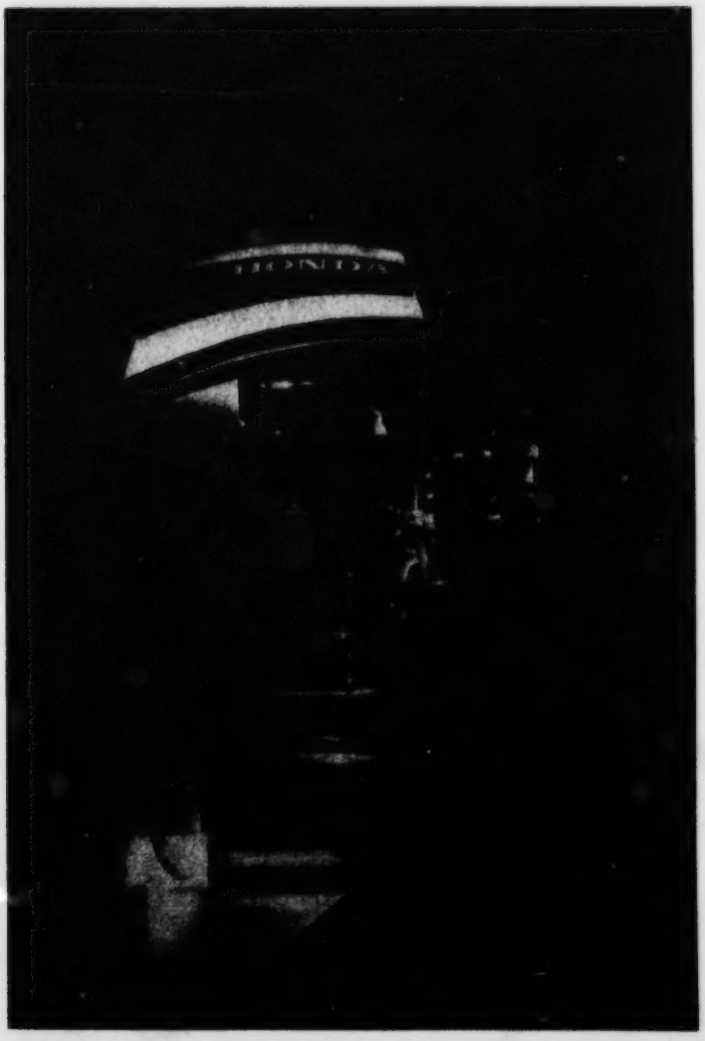


Beach and estuary at half tide.
Plage et estuaire à mi-marée



The salvaged oyster boat.

Embarcation de pêche
à l'huître récupérée.



Engine and gasoline can.

Moteur et réservoir
à essence.